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Competency of adult learners in learning: Application of the Iceberg Competency Model

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Abstract

Adult learning is a part of continuous learning concept that takes place for a lifetime. It encompasses several programmes for the enhancement of compentecy consist of knowledge, skills, and abilities. This research paper is published for the purpose of analysing the competency level of adult learners by applying the *Iceberg* competency model. The research focused on several aspects including learning requirement, application and strategy. Furthermore, it also attempted to identify the competency level together with learning requirement, application and strategy. For sampling technique, probability sampling with simple random sampling was employed. Research samples were 133 adult learners who are undergraduates at Universiti Tun Hussein Onn Malaysia (UTHM). Mean score, standard deviation and hierachical arrangement were used for reporting descriptive data. Results show that the learners' learning requirements are high. Likewise, analysis of their competency level also shows high scores for the interpersonal skill and knowledge domains. Overall analysis of the competency level of the adult learners shows the highest level of agreement for attitude and value domains. The results also show that the competency level of the learners is high even though the competency level can change from time to time. Therefore, teachers need to establish a system to evaluate the competency of adult learners. The system will serve as a benchmark in monitoring their competency.

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Keywords: Adult learning; competency; learning strategies

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1. Introduction

Adult learning is one of the branches in education that is liberal in nature. It enables the adults to improve and widen their knowledge and skills besides improving their academic qualification. Cercone (2008) stated learning is about change, and adult learning is also about change. In essence, Coles (1969), defined adult learning as education for male and female adults for the purpose of fulfilling various needs and interests based on one's capability and understanding level. Furthermore, it also aims to cater changes of roles and responsibilities in life. Adult learning is also a part of the concept of continuous learning that takes place in lifelong period. Jain and Martindale (2012) argued continuous learning is not limited to those in the working group rather it is important for short and long term success of both individuals and organizations. Instead, it reaches out to people from all walks of life. It encompasses programmes for the enhancement of knowledge, skills and attitudes that take place formally at learning institutions or informally through daily or workplace experience. Considering majority of those involved in adult learning are in the working froup, adult learning process mostly focuses on workplace organisations. At these places, adult learning refers to a concept where workers gain knowledge and skills through experience shared with fellow staff. Within the scope of an organisation, adult learning is mostly continuous learning which purpose is enhance knowledge and skills towards achieving career development.

Continuous learning is defined as adult learning or andragogy. Jain and Martindale (2012) defined continuos learning as an ongoing process of learning and development in the organizational context, also can be viewed as a subsut of lifelong learning process. Similarly, Knowles (1980) stated continuos learning is not only limited to learning process at schools but also refers to learning that takes place for a lifetime. Terminologically, adult learning refers to the arts and science of helping adults to learning. Furthermore, according to Knowles (1980), adult learning is defined as a process where individuals are no longer attend schools but instead involve in informal learning activities for the aim of improving their knolwedge, skills and abilities. This will help them to find solutions to their personal and community problems. Knowles (1984) proposed a model for adult learning that emphasises on four aspects that differentiate between adult and non-adult learners. The aspects are 1) Independence; 2) Experience; 3) Readiness to learn; and 4) Learning orientation.

Adult learners are naturally independent, with specific objectives, problem solvers as well as full of experience. Kuhn and Pease (2006) argued that adult may learn effectively because they learn more rapidly because they have a greater base of knowledge to bring o their knowledge. In most cases, adult learners have gone through processes in life that provide experience which in turn serves as learning resources. As their social responsibility elevates, adult learners also have the readiness to improve their standard of education. Furthermore, their learning orientation also changes in tandem with their age increment, moving away from subject-based learning to problem-based one.

Adult learners normally have the intention to learn for the purpose of improving their standard of living as well as enhancing their professional quality. Therefore, technical and vocational-based education are learning approaches that are suitable for adult learning. According to the UNESCO, ILO (2001), technical and vocational-based education refer to an aspect in educational process that involve research in science and technology, skills, attitude, understanding and knowledge related to professions in economic sector and social life. Technical and vocational-based education play an important role in social and economic development to prepare individuals for working environment and create new job opportunities. Ansah and Ernest (2013) stated the purpose of technical and vocational education is to equip individual with the technical and professional skills needed for socio-economic development of the country. Similarly, Mykerezi (2003) asserts technical and vocational education is a structural change instrument to help individuals to live as well as to have a source of income. As most adult learners are working individuals, technical and vocational education is a learning method that can enhance skills and competency in their jobs.

Henceforth, this research was purposely conducted to study competency of adult learners in learning process that encompass their understanding of requirement in adult learning, application and understanding in learning to determine learners' competency and adult learners' learning strategy. This research analysed learners' competency level using the Iceberg competency model from the aspects of learning requirement, application and strategy.

2. Conceptual background

This research was carried out by collecting data from adult learners who are pursuing education at public universities. Adult learners' competency in learning include the need to understand and apply learning as well as to employ suitable learning strategy. To measure all these, the Iceberg competency model was employed as the basis for measurement. The research's conceptual framework is illustated in Figure 1.

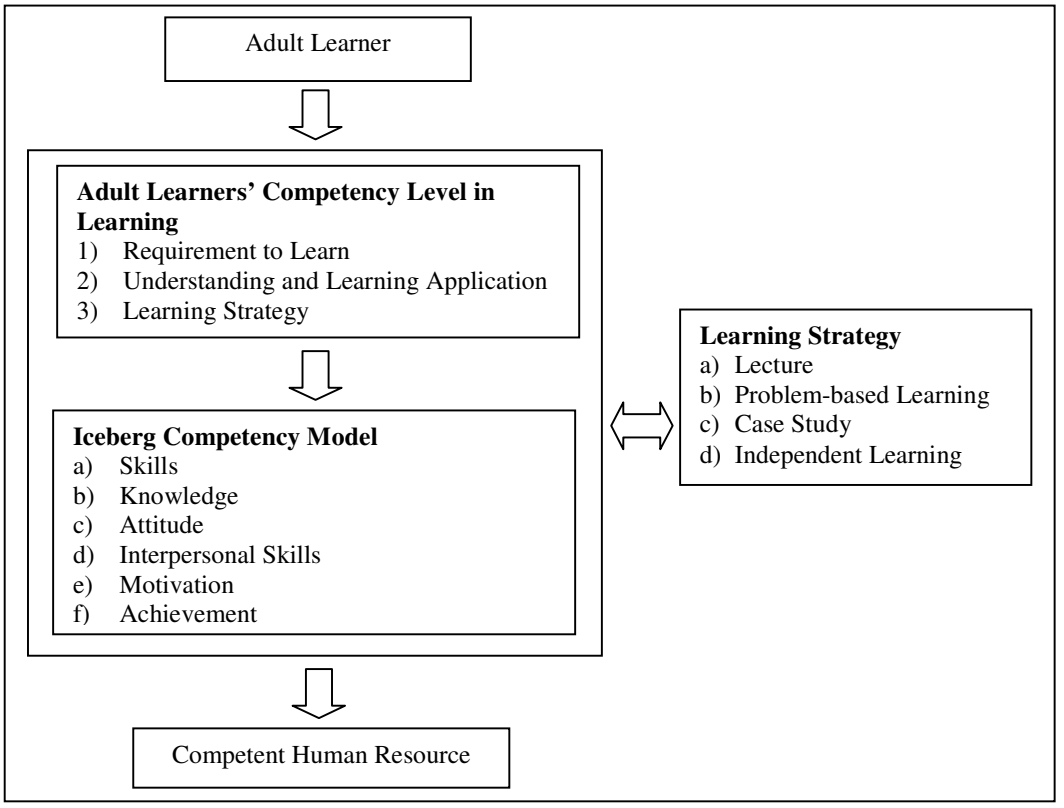

Fig. 1. Research's Conceptual Framework.

2.1. Adult Learning

Adult learning or andragogy is one of the important aspects of nation building. There are various definitions of adult learning. According to Dwyer (2004) Learning should be seen as life experience and requires scientific learning method. An individual learns when perception towards reality is not harmonious with experience. For examples, during life crisis or dilemma such as divorce, job loss and so on, a person will gain experience from these disharmony situations. Under such circumstances, learning will be enhanced. Adult learning experience emphasises on learners' ability to be independent as their learning objectives.

Basically, adult learning involves individuals who either have working experience or are still in-service. The teaching and learning process for adult learners is different from the one undergone by non-adult learners. According to Davies (1984), the way adult learners learn can be categorised into physical, mental and social aspects. Physically, adult learners are more sensitive to their surrounding as they are inclined to pose questions to the teachers. Adult learners prefer to learn using problem solving method where satisfaction in learning is achieved through the application of relevant experience and hands-on learning. To them, time is valuable. They also prefer to be given specific topics rather than general ones. From the social aspect, almost all adult learners have a variety of

life experience. Dwyer (2004) stated that adult learning process can be controlled when the teaching content is related to the experience that they have gone through. By taking that into consideration, learning process that relates life experience to learning content will give more understanding and appealing to adult learners.

There are several methods to help adult learners to learn. According to Cranton (1989), the methods can be divided into four categories namely; 1) teacher-centred; 2) interactive; 3) independent; and 4) experience-based. These methods are supported Burts et al. (2006) who listed four main strategies that match the ones used by Cranton (1989). These strategies include lecture, problem-based learning, case study and independent learning. The choice of a correct strategy depends on the characteristics of adult learners. Lecture is a learning strategy that is teacher-centred. This strategy has a low learning level, suitable for dependent adult learners who lack self-confidence. Meanwhile, the interactive method employs communication among learners as well as between learners and teachers. The suitable learning strategy for this method is case study. This method facilitates afective (attitude) and cognitive (knowledge) learning and most adult learners appreciate the opportunity to interact and share their experience.

The independent method is based on the assumption that each adult learner has unique learning level. To facilitate learning process, teachers need to give learners with immediate and consistent response. Learning strategies that belong to this method include module-based and computer-assisted learning. They are suitable for low cognitive learning. Nevertheless, if students are taught in a good way, this method can be used for any type of learning. Through the experience-based learning, learning situation is organised to involve learners in problem solving. An example of this learning strategy is problem-based learning. This method is useful for learning that require high level of cognitive, afective and psychomotor

2.2. Adult learning requires competency model

Competency comes from the word competent or expertise that refers to an ideal situation and quality or physical and intellectual qualifications of individuals in carrying out specific tasks. According to the United Nations Industrial Development Organization [UNIDO] (2002), competency encompasses a combination of knowledge, skills and behavior that are practiced for self improvement. Similarly, Salleh (2012) defined competency as set of skills, knowledge, and behavior, which characterize better performance in every aspect of an individual. Competency exists due to values in life, attitude and internal motivation of individuals to complete tasks in hand perfectly and produce excellent job. According to Rychen and Salganik (2001), competency is not merely about knowledge and skills. Instead, it involves the ability to fulfill complex demands by preparing psycho-social resources such as skills and attitude in specific context. Every organization have different concept of competency. According to Selvarajan and Candy (2006), from the management perspective, competency refers to a combination of resource and ability. On the other hand, the human resource management perceives competent as the ability of individuals to complete the tasks assigned to them. The main purpose for organization to apply the concept of competency is to facilitate the process of evaluating the suitability and expertise of employers in completing assigned tasks. Basically, competency includes three important aspects which are knowledge (cognitive), attitude (affective) and skills (psychomotor) that are combined to solve certain assignments (UNIDO, 2002). Figure 2 illustrates the competency model that is based on the three aspects that can be used by organizations.

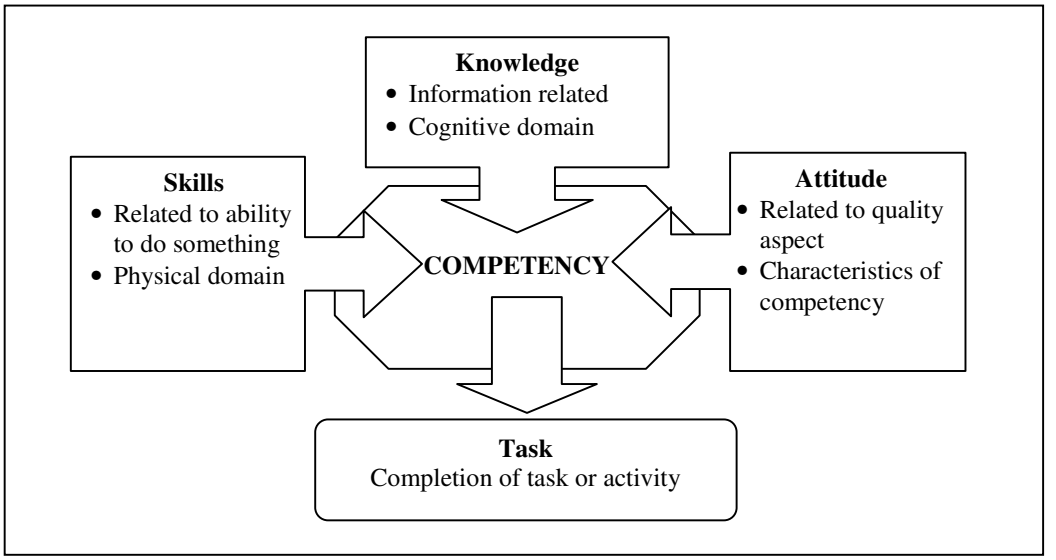

Fig. 2. Main aspects in competency model (UNIDO, 2002).

Figure 3 shows the Iceberg competency model which is one of the competency models which is based on three main aspects namely knowledge, attitude and skills. It is also one of the models that is frequently adapted and modified at organisations for establishing competency model.

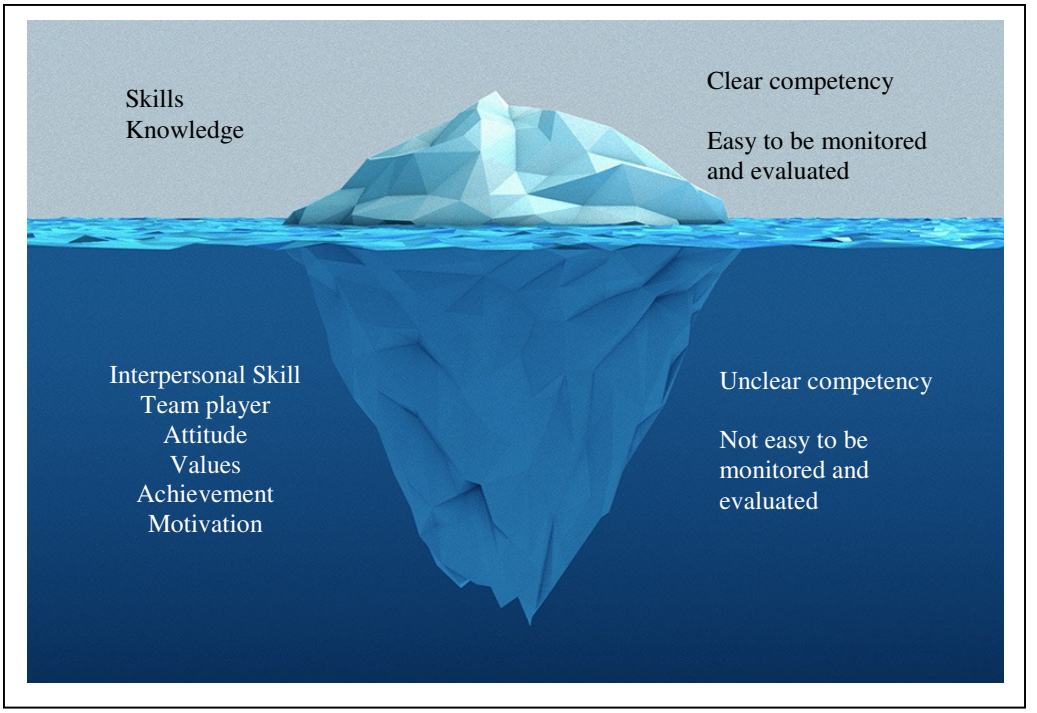

Fig. 3. Iceberg competency model (MIT Careers, 2005).

Competency-based approach is a strategy that is utilised to ensure individuals to obtain characteristics related to the tasks assigned to them. Bernotavicz, Jordan, Zanghi, and Jacobos (2001) in their research emphasised on the employment of competency model to ensure the effectiveness in carrying out assigned tasks. The model includes specific task and individuals who carry out the tasks in the context of organisation Meanwhile, Bratton (2004) in his research explained on the importance of building a core competency framework for specific job and position. Core competency is defined as knowledge, skills, attitude, motives, values or personal characteristics which are important for completing a job and evaluating the performance of a worker to be either good or excellent.

In the context of technical and vocational education, competency-based learning or competency analysis is a very important requirement. This is supported by Chih, Wen, Fang, dan Yi (2003) who stated that in the effort to achieve the objective of technical and vocational education and effective training, an indespensible aspect that needs emphasis is the analysis of content for competency in education and training. This is to ensure the standard and other matters related to measurement of competency can be identifide.

3. Methodology

A descriptive research design is used in this research to describe the findings. Research design is an important aspect in research. Choosing the suitable and accurate research design will influence research findings. This is also to ensure data collected to match research objectives. Choosing the right research design can reduce doubts about reliability and accuracy of research findings. Therefore, this research is a quantitative non-experimental research that employs questionnaire as instrument. Descriptive analysis was conducted to determine mean and standard deviation values for each item.

The location for this research was Universiti Tun Hussein Onn Malaysia (UTHM). The University was selected as it matches the research objective which is to find out about adult learners' competency level in the Iceberg competency model-based learning. UTHM is one of the public institutions in the country that offers adult learning.

In this research, research samples were chosen through probability sampling with simple random sampling method. The method was selected as random sampling procedures are suitable in making sure each subject in the population has the equal chance to be selected as respondents (Latham, 2007). To determine the suitable sample size for this research, the researchers used a table developed by Cohen, Manion, and dan Morrison (2001). The research population was a total of 188 adult learners. According to the table, this quantity is within the range of 100 to 200 population size by taking into account 0.05 siginificant level that requires the minimum of 132 samples. In this research, the real number of samples was 133 samples.

The main instrument used was questionnaire. Items in the questionnaire were built based on research questions and objectives, following the domains in the Iceberg competency model. Likert scale was selected due to its' suitability in measuring the competency level of adult learners in learning. The five Likert Scale points namely Strongly Disagree (SD), Disagree (D), Neither Agree nor Disagree (N), Agree (A) and Strongly Agree (SA) were used to measure respondents' perception on the statements given.

4. Findings and Discussion

The research analysis carried out was descriptive analysis based on mean score values and standard deviation for each domain in Iceberg competency model. Explanation of mean score is based on interpretation of Likert Scale in the research instrument. Analysis of total mean score for each competency domain is shown from Table 1 to Table 2. Based on research findings, it can be seen that all competency domains shows high mean score values and are close to each other. However, interpersonsal skill and knowledge domain show high overall mean values (M=4.33, SD=0.525). Based on the overall mean score, each competency domain can be arranged according to understanding of the adult learners' requirements to learn. The standard deviation for all competency domains is low and this shows that distribution of respondents' responses did not deviate far from mean value that was obtained from the analysis.

The overall analysis of the adult learners' requirements to follow learning in Table 1 shows arrangement of levels in competency levels for adult learners. Based on the table, it is found that the Interpersonal Skills (*M*=4.33, *SD*=0.525) and Knowledge (*M*=4.33, *SD*=0.610) are domains that obtain the highest acceptance from the respondents. However, there is only small mean difference which is 0.3 between the highest and lowest domains which is the Motivation domain (*M*=4.03, *SD*=0.651).

Table 1 *Mean score and standard deviation for the requirements for adult learners to follow learning based on competency domain*

Bil	Competency Domain	Mean *(M)*	Std. Deviation *(SD)*
1	Interpersonal Skills	4.33	0.525
2	Knowledge	4.33	0.610
3	Attitude and Values	4.25	0.567
4	Achievement	4.21	0.576
5	Skills	4.05	0.672
6	Motivation	4.03	0.651
	Total Value	**4.20**	**0.432**

The overall analysis on the adult learners competency level in learning presented in Table 2 shows the arrangement of the competency domains for adult learners. Based on the table, it is found that Attitude and Values domain received the highest agreement from the respondents. (*M*=4.25, *SD*=0.433). However, only a small mean difference was found between the highest and lowest domains in the Skills Domain which is 0.2 (*M*=4.05, *SD*=0.482)

Table 2 *Competency level of adult learners according to domains in learning*

Bil	Competency Domain	Mean *(M)*	Std. Deviation *(SD)*
1	Attitude and Values	4.25	0.433
2	Achievement	4.19	0.416
3	Motivation	4.18	0.463
4	Interpersonal Skills	4.16	0.348
5	Knowledge	4.15	0.417
6	Skills	4.05	0.482
	Total Value	**4.15**	**0.351**

In this research, the requirement for adult learning is research based on six competeny domains in the iceberg competency domain. The domains are 1) Knowledge. 2) Skills; 3) Attitude and Values; 4) Interpersonal Skills; 5) Motivation; and 6) Achievement. Overall, the findings shows that adult learners are aware of the requirements of adult learning. This can be seen from the mean score and standard deviation obtained from analysis on the items in the questionnaire. All six competency domains show mean values that are close to each other. Furthermore, the values are at a high level based on interpretations of means score used. This indicates the understanding of adult learners towards the learning process. This is in line with Knowles (1970) who stated that adult learners involve in learning when they finds out that the aims of life is worth the effort they carry out when the needs arise.

From the findings obtained, it was found that the interpersonal skills and knowledge domains are placed highest in the hierarchy. This shows that adult learners learn to seek knowledge and interpersonal skills. New knowledge is needed to complement the emergence of new technology. Meanwhile, interpersonal skills are basic skills in individuals that are continuosly needed when dealing and communicating with other people (Barakat, 2007). The finding could be infleunced by the number of respondents who are adult learners with work experience and work in the fields of administration and management. By being leaders, the adult learners need to stay ahead in every aspects including knowledge. This enables the learners to use the knowledge to ensure effective managementThis finding is supported by Burts et al. (2006) who stated that adult learners need to involve in learning process that could help them to facilitate them to deal with problems they face in daily situation. However, there have been contradictory opinions related to the requirements of adult learners' learning. According to the Division of Adult Education, Indiana Department of Education (2004) adult learners need to involve in learning in order to improve skills needed in their work. Based on the research findings, it is discovered that the skills domain has the lowest mean values of all the six domains in the Iceberg competency model. This contradiction may be due to the respndents' differences in their cultural and professional background and life experience.

Generally, competency level of adult learners in learning is obtained from the application and understanding of learning according to domains in the iceberg competency models. This is in accordance with UNIDO (2002) regarding competency which claims that it is a combiantion of knowledge, skills and behaviour that are applied for self improvement. From the research, it is generally discovered that the competency level of learners in adult learning is high based on agreement level. This can be witnessed from the analysis done on the respective items in the questionnaire. All six competency domains recorded mean values that are close to each other. They are at a high level based on agreement and mean score interpretation used. Overall, the findings also show that adult learners involved in the research are competent in their learning.

Through findings that are arranged hierarchically, the attitude and values domain is placed at the highest level. This is followed by the achievement, motivation, interpersonal skills, knowledge and finally skills domains. This shows that the learning process enables adult learners to inculcate attitude and personal positive values such as patience in carrying out assigned job, able to use positive values and attitude in problem solving and work hard in looking for sources and opportunities to improve their standard of living. From the findings, it was also found that competency of adult learners in the attitude and values domain is more directed to the ability to adapt postive values and attitude in ensuring effective jobs carried out. The hight competency is the attitude and values domain also can change adult learners to be more responsible with events that take place in their lives and the surrounding they live in.

The skill domain has th lowest mean score. This shows that of the six competency domains, the skill domain is the least mastered by the adult learners. The skills involved are technical skills that require physical activity. This could be due to the inability of the adult learners to masters technical skills taught because of age factor and personal weaknesses such as health factor. Nevertheless, this does not mean that the adult learners lack the skill competence. In fact, analysis shows that the findings show that the learners have mean value that is considerably high. Adult learners who are competent in the technical field are able to master the learned technical skills and know how to apply the skill in the required time. They can also apply the skills without instruction or guidance from the teachers.

5. Conclusion

Based on the findings, adult learners realised the importance of education. A combination of their understanding of the learning requirements and the application of the correct and suitable learning strategy has enabled the learners to be evaluated. Overall, it can be concluded that the adult learners have a high competency level. The adult learners are individuals with various background and philosophies. These have caused them to have differing awareness towards the importance of learning. Hence, in catering these differences effectively, the adult learners need to involve in the initial stage of the learning process such as duirng the establsihment of learning aims and objectives. Considering that the adult learners need to understand the need to learn, it is important for teachers to ensure the needs to be addressed accurately through various teaching and learning activity.

Overall, it was found that the adult learners have a high competency. This shows that the expertise of adult learners towards the learning process is high too. Nevertheless, the learners comeptency level changes from time to time. To ensure the competency to improve, it is importsnt for instructors need to activities in order for the competency of adult learners to improve. Moreover, teachers need to create a system to evaluate competency of adult learners that will serve as a benchmark in monitoring the competency level of adult learners.

The findings also show that problem-based learning is the most suitable strategy to be applied in adult learning. Hence, the strategy needs to be used as a startegy in the adult learning process. Nevertheless, as a class of adult learners is made up of learners with differing age and background, modification needs to be the learning strategy needs to be done. A combination of learning strategies in the teaching and learning process is seen as an interesting and effective idea in catering the different needs of the learners.

References

Ansah, S. K., & Ernest, K. (2013). Technical and vocational education and training in Ghana: A tool for skills acquisition and industrial development. Journal of Education and Practice, 4(16), 172-180.

Barakat, N. G. (2007). Interpersonal skills. Libyan Journal of Medicine, 2(3), 152-153. doi: 10.4176/070620

Bernotavicz, F., Jordan, P. A., Zanghi, M., & Jacobus, M. V. (2001). A competency model for adolescent caseworkers: Partnering with youth as they transition to dependent. Institute for Public Sector Innovation-Edmund Muskie School of Public Service.

Bratton, D. A. (2004). Taking on the competition with core competencies. Retrieved from http://www.hr-info.com/.

Burts, D. C., Dicarlo, C. F., Ota, C., Laird, R., & Gioe, C. (2006). Training and the needs of adult learners. Journal of Extension, 44(6).

Cercone, K. (2008). Characteristics of adult learners with implications for online learning design. AACE Journal, 16(2), 137-159.

Chih, Y. C., Wen, C. L., Fang, E. C., & Yi, L. H. (2003). Construction of a competency analysis model for vocational high schools. World Transactions on Engineering and Technology Education, 2(1), 121-124.

Cohen, L., Manion, L., & Morrison, K. (2001). Research method in education (5th ed.). London, England: Routledge

Coles, E. T. (1969). Adult education in developing countries. Oxford, England: Pergamon Press

Cranton, P. (1989). Planning instruction for adult learners. Toronto, ON: Wall & Thompson

Division of Adult Education, Indiana Department of Education (2004). Knowing adult learners. Indiana handbook for teachers of adult education, 13-24.

Draves, W. A. (1984). How to teach adults. Manhattan, KS: Learning Resources Network.

Dwyer, R. J. (2004). Employee development using adult education principles. Journal of Industrial and Commercial Training. 36(2), 79-85

Jain, S., & Martindale, T. (2012). Facilitating continuous learning: A review of research and practice of individual learninfg capabilities and organizational learning environments. Retrieved from http://www.memphis.edu/icl/idt/clrc/clrc-smita-research.pdf

Knowles, M. S. (1970). The modern practice of adult education: Andragogy versus pedagogy. Chicago, IL: Follett.

Knowles, M. S. (1980). The modern practice of adult education: from pedagogy to andragogy. Englewood Cliffs, NJ: Prentice Hall

Knowles, M. S. (1984). Andragogy in action: Applying modern principles of adult education. San Francisco, CA: Jossey Bass.

Kuhn, D., & Pease, M. (2006). Do children and adults learn differently?. Journal of Cognition and Development, 7(3), 279-293.

Latham, B. (2007). Sampling: What is it?. Retrieved from http://webpages.acs.ttu.edu/rlatham/Coursework/5377(Quant))/Sampling_ Methodology_Paper.pdf.

Mykerezi, P. K. (2003). The potential contribution of vocational and technical education to the future social-economic development of Albania. Available from ProQuest Dissertations and Theses database. (UMI No. 3082598)

Rychen, D. S., & Salganik, L. H. (Eds.) (2001). Defining and selecting key competencies (pp. 1-15). Gottingen, Germany: Hogrefe & Huber

Salleh, K. M. (2012). Human resource development practitioners' perspectives on competencies: An application of American Society for Training and Development (ASTD) Workplace Learning and Performance (WLP) competency model in Malaysia. Available from ProQuest Dissertation and Theses database. (UMI No. 3551639)

Selvarajan, T. T., & Cardy, R. L. (2006). Competencies: Alternative frameworks for competitive advantage. Business Horizon, (49), 235-245.

United Nations Industrial Development Organization (2002). UNIDO competencies: Strengthening organizational core values and managerial capabilities. Vienna, Austria: UNIDO

UNESCO, ILO (2001). Technical and Vocational Education and Training for the twenty-first century (Technical Report). Retrieved from unesdoc.unesco.org/ images/0012/001260/126050e.pdf